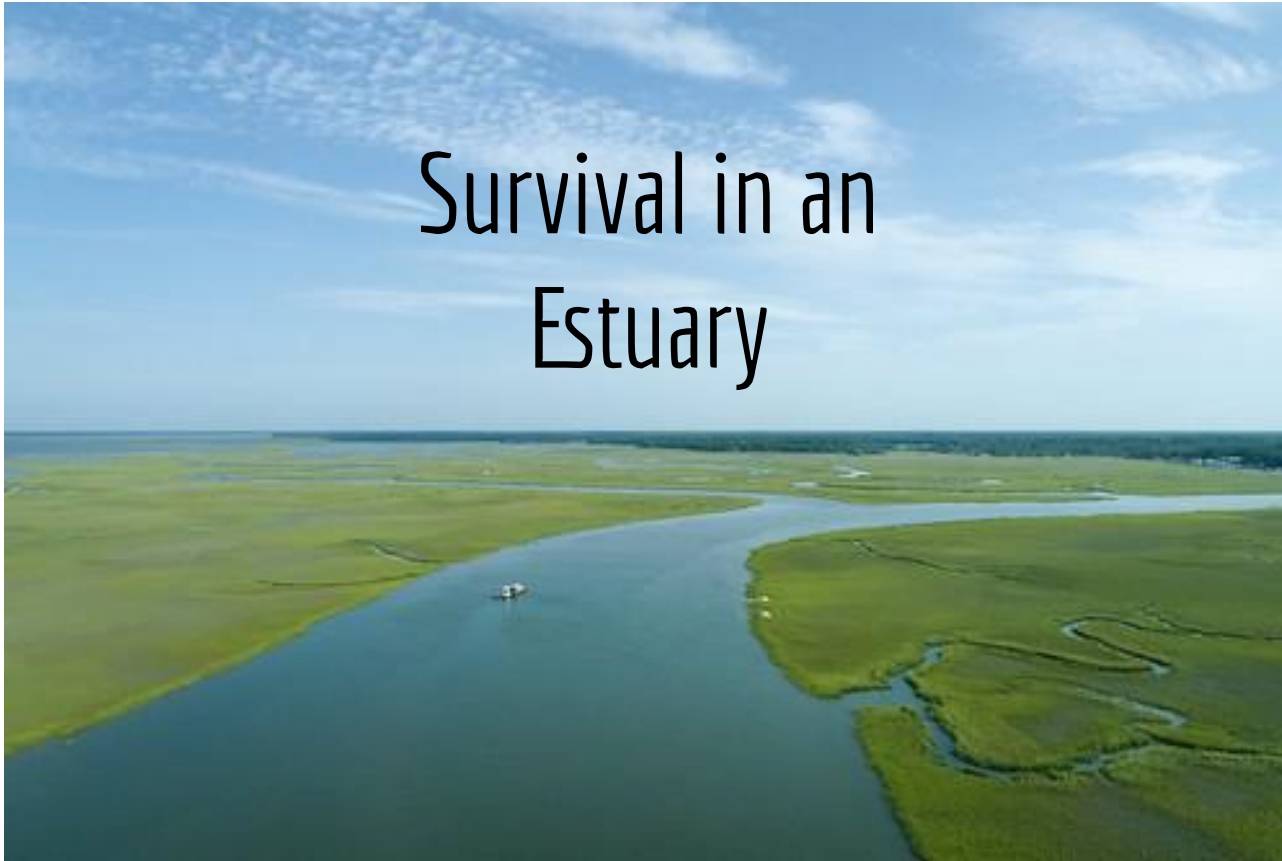




# Survival in an Estuary



SC Department of Natural Resources

ACE Basin National Estuarine Research Reserve

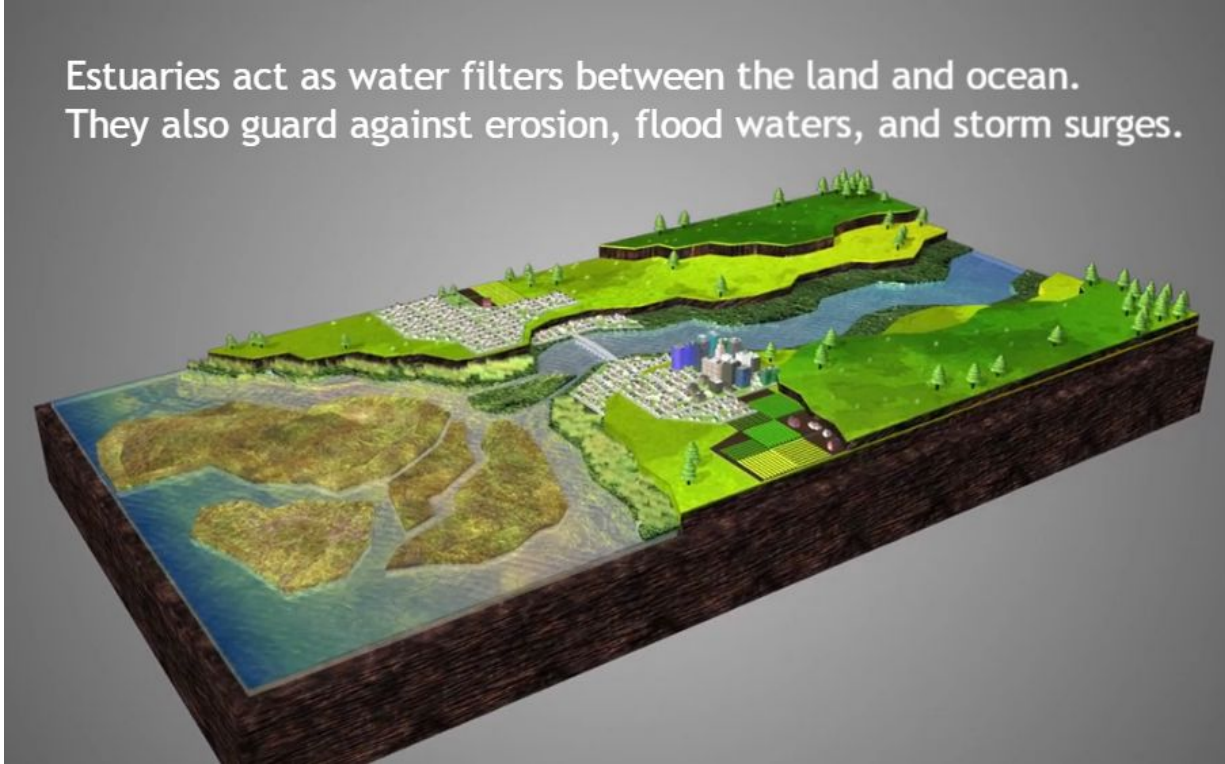
# What is an Estuary?

An estuary is a partially enclosed body of water where two different bodies of water meet and mix. It's where the rivers meet the sea!



# Estuaries are nature's water filters

Estuaries act as water filters between the land and ocean.  
They also guard against erosion, flood waters, and storm surges.



# Benefits of an estuary

- It provide shelter and many habitats for juvenile animals
- It is a nursery habitat for baby animals
- Marsh grass slows down the impact of the water rushing in during a storm
- Oyster reefs act as barriers, helping prevent erosion, also providing habitat for small marine species
- It is a diverse ecosystem providing food for many animals including us
- It helps the economy by use of boats, fishing, ecotours, commercial harvesting and research





# Estuary features and landforms

**Salt marshes** form in areas protected from high-energy waves.

**Tidal flats** are part of many estuaries. Oysters and clams are harvested here.

The **plants** and **animals** that live here have adapted to live in this tidal dependent ecosystem.



# Who lives in an estuary?



# What do they need to survive?

- Air
- Food
- Water
- Shelter

## Abiotic Factors-Water Quality

- Temperature
- pH
- Salinity
- Dissolved Oxygen

What can affect these factors?







# National Estuarine Research Reserves



<https://coast.noaa.gov/nerrs/>



# System Wide Monitoring Program (SWMP Stations)

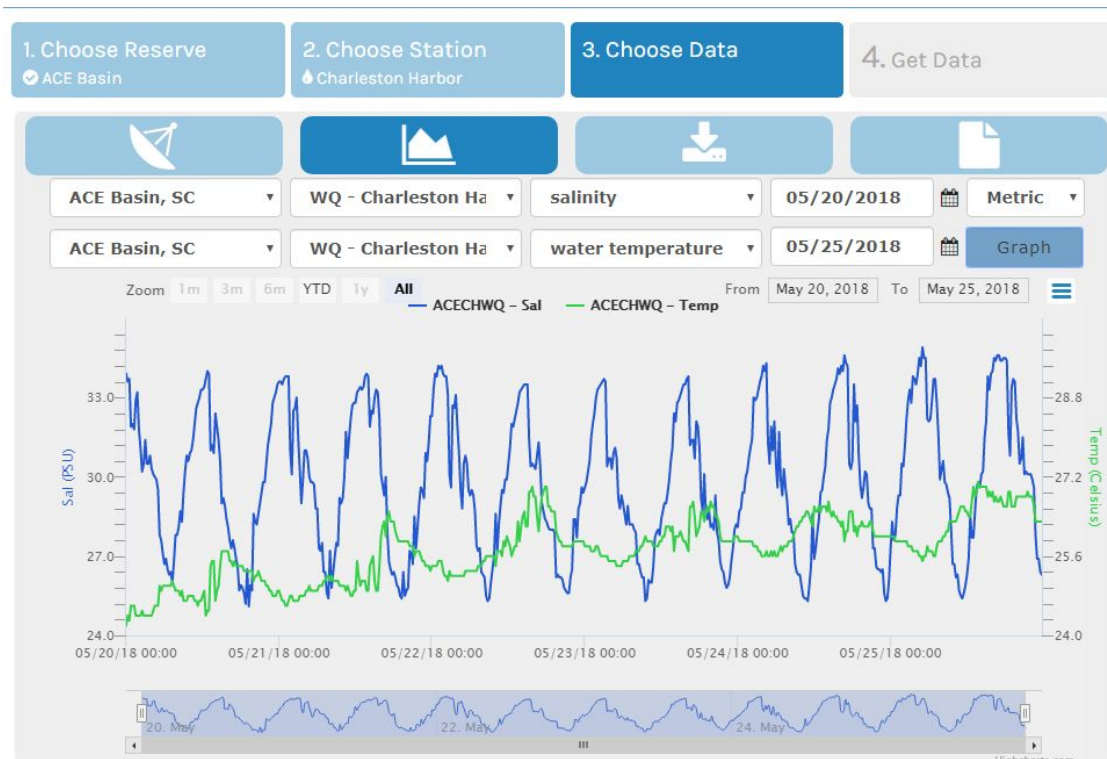


# What are we measuring?

- Water Temperature in Celsius
- Salinity
- Dissolved Oxygen
- pH
- Turbidity
- Precipitation (metric station)







# Water Quality Data Graph Example



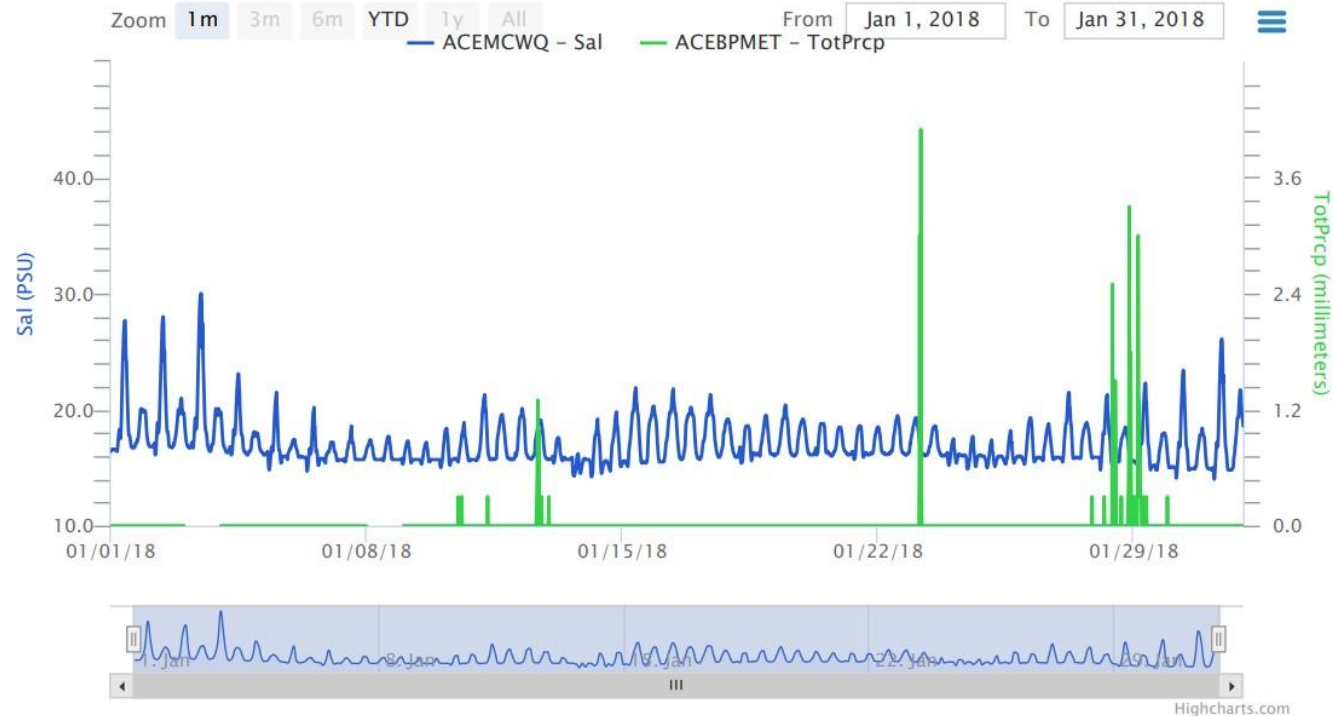
# Species Tolerance Cards

Look at your card and determine if your animal would have been able to survive during the conditions during the time period on each graph.

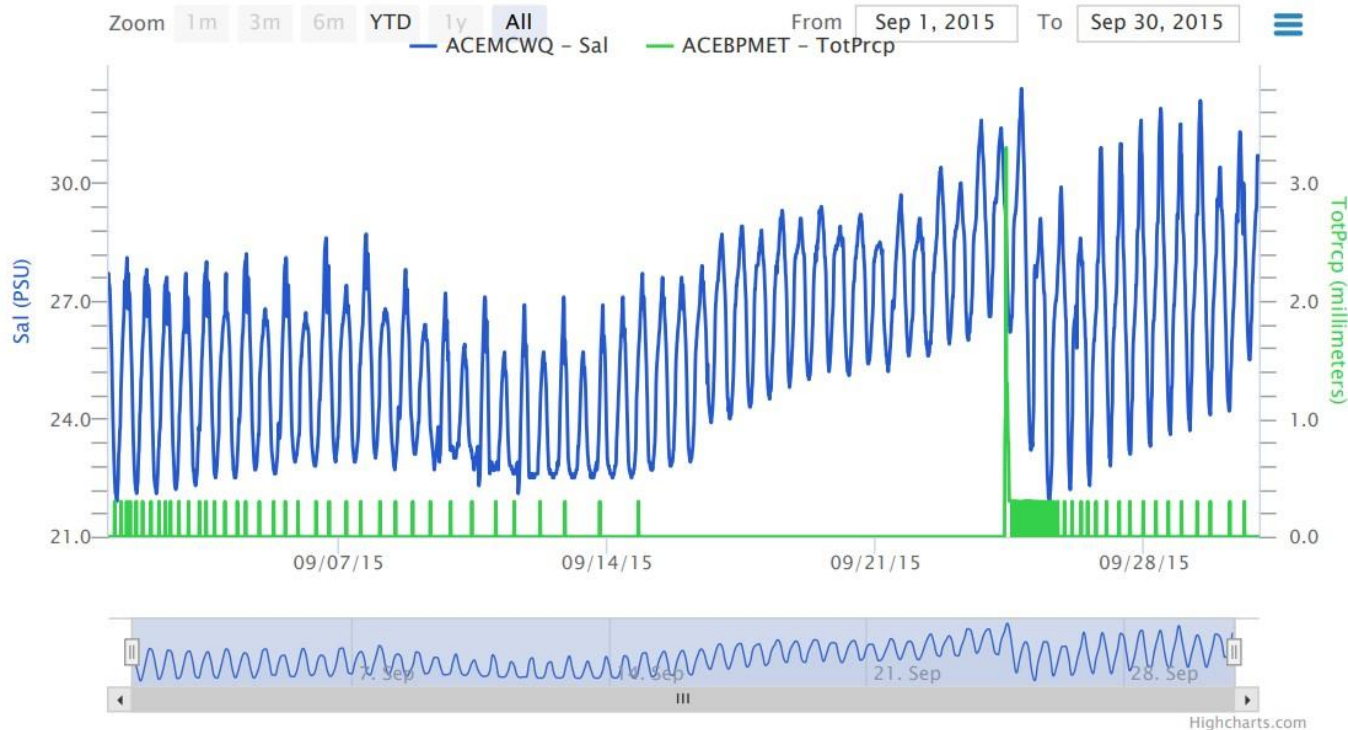
<p><b><u>Temperature:</u></b></p> <p>15-27 °C</p> <p>Winter fish kills of seatrout occur when air temperatures drop to 7 °C for 12 hours or more.</p> <p><b><u>Salinity:</u></b> 11-44 ppt</p> <p>Spawning generally peaks when salinity in the home estuary is high, typically 30 – 35 ppt</p> <p><b><u>Dissolved Oxygen :</u></b></p> <p>Above 3 ppm</p>	<p><b>Spotted Sea Trout</b></p>  <p><b><u>Habitat:</u></b></p> <p>All ages live in estuaries and rivers, but they are also found in shallow coastal bays and sounds and possibly along front beaches of barrier islands.</p> 	<p><b><u>Temperature:</u></b></p> <p>10-38 °C</p> <p>Winter shrimp kills of white shrimp occur when air temperatures in drop below 9°C for five days or more.</p> <p><b><u>Salinity:</u></b> 2-35 ppt</p> <p>Post larvae survive best in low temperatures if salinity is high.</p> <p><b><u>Dissolved Oxygen:</u></b></p> <p>Above 3 ppm</p>	<p><b>White Shrimp</b></p>  <p>SCDNR</p> <p><b><u>Habitat:</u></b></p> <p>Adults live in estuaries typically over muddy bottoms. They move to the ocean for reproduction.</p> <p>Juveniles live in tidal creeks, oyster reefs and estuaries, typically over muddy bottoms. They move closer to estuary mouths as they grow up.</p> 
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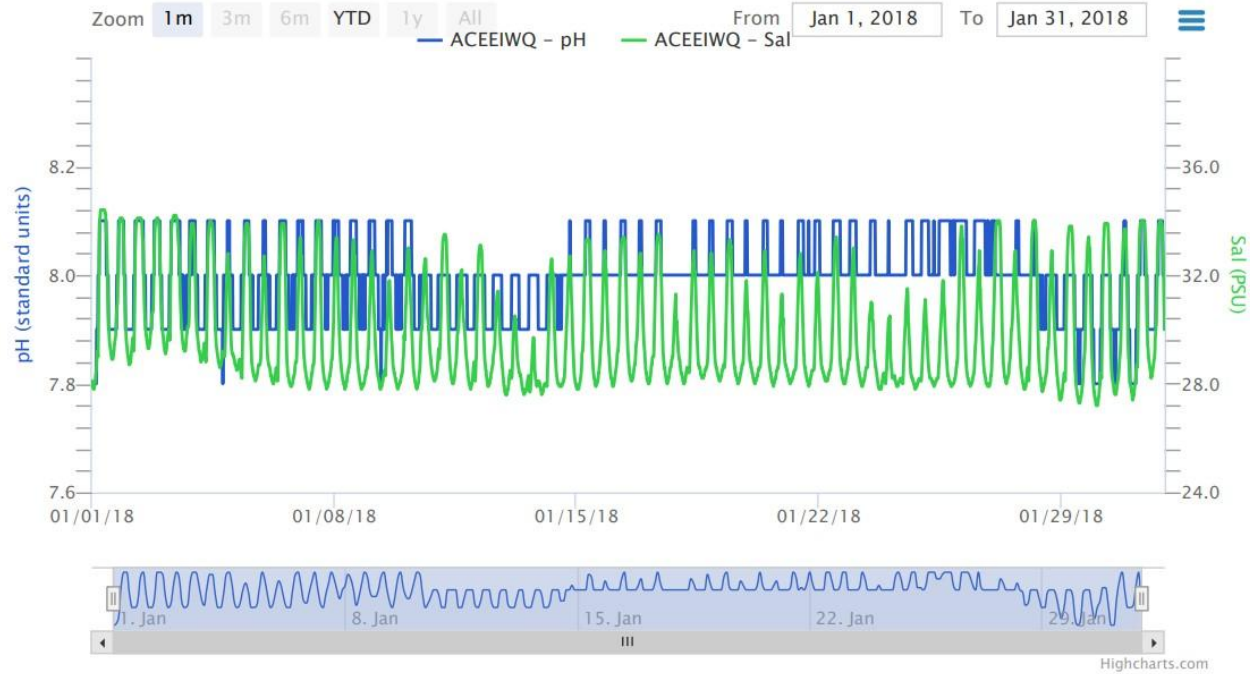
# Salinity and Precipitation at Bennett's Point, January 2018



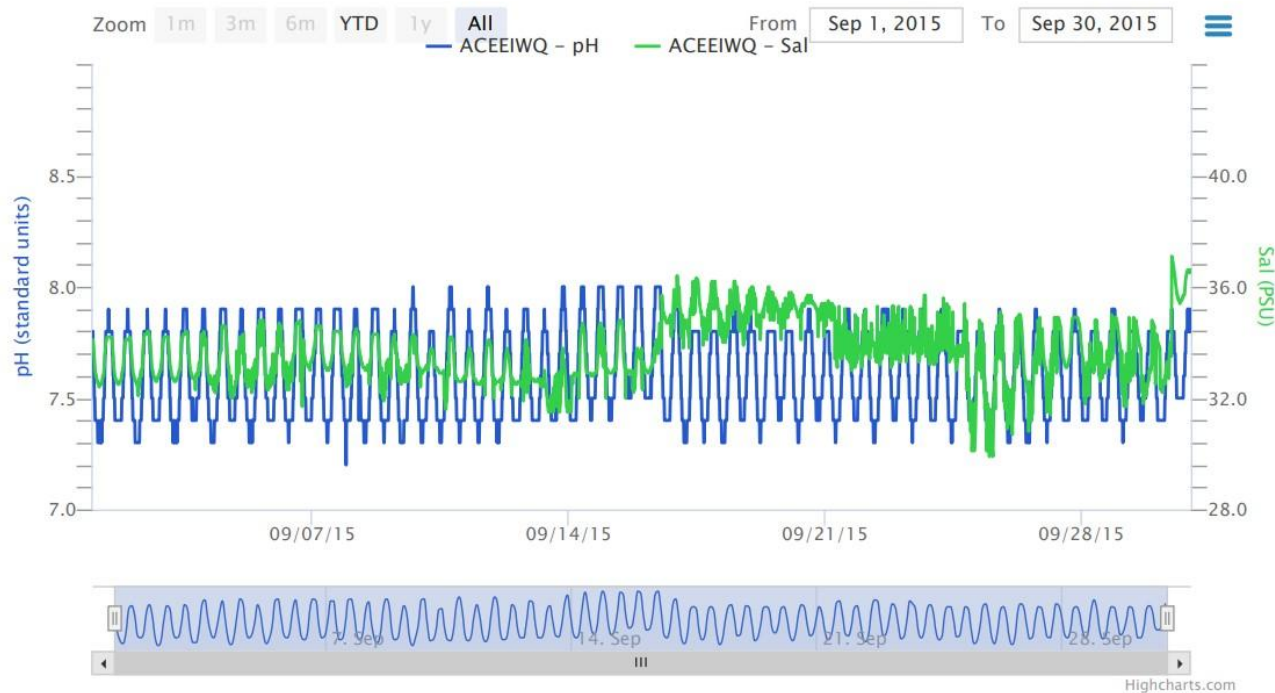
# Salinity and Precipitation at Bennett's Point September 2015



# pH and Salinity at Edisto January 2018

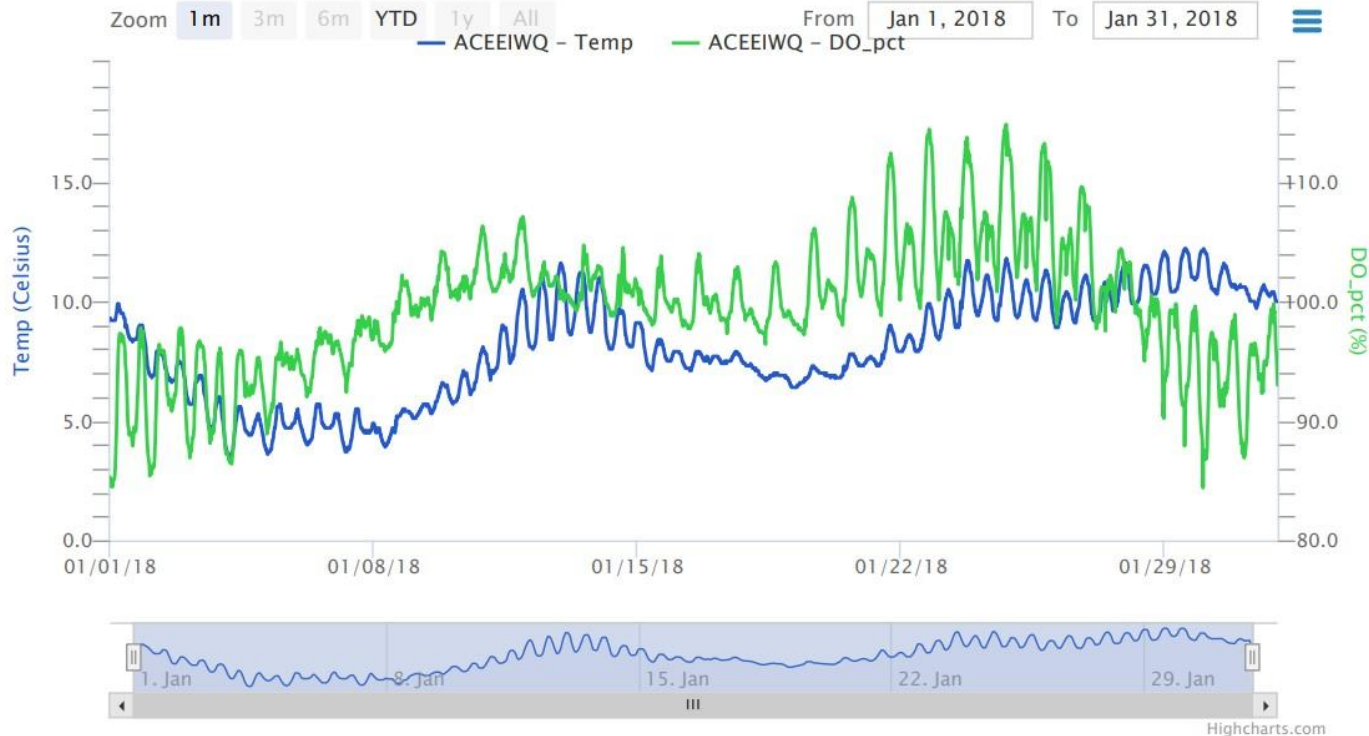


# pH and Salinity at Edisto September 2015

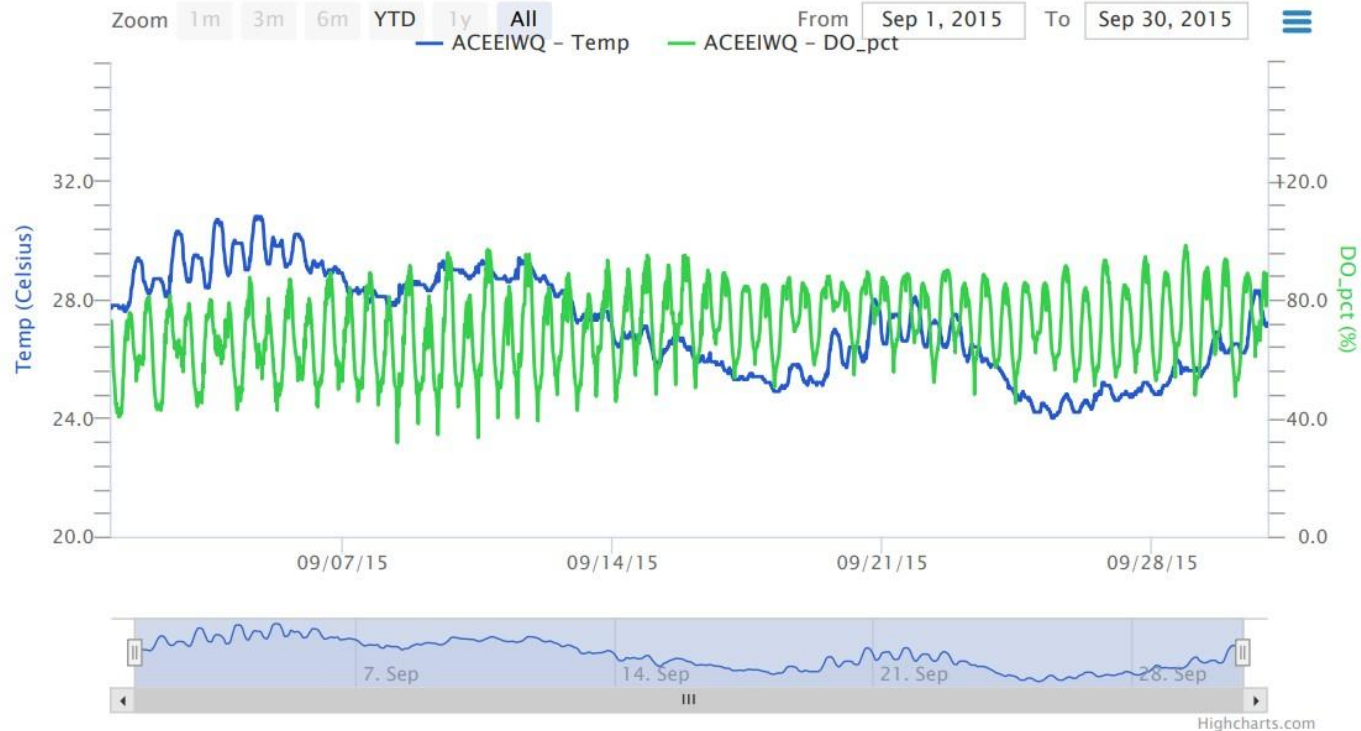




# Water Temperature and Dissolved Oxygen January 2018



# Water Temperature and Dissolved Oxygen Edisto 2015



# Conclusion

- What conditions affect animals that live in the estuary?
- What are some ways animals can tolerate certain conditions?